



Installing long-span roof trusses

Building roofs for barns and other large structures requires careful planning, coordination, and a well-trained workforce.

Erecting roof trusses is a high-risk activity. Much of the work is carried out above the ground, and trusses themselves are not stable until they are secured and sufficiently braced.

The risks are even greater when long-span roof trusses are used to build large structures such as barns. Unsafe work practices can result in potentially fatal falls from heights, while improper truss installation or bracing can cause the roof to collapse during the erection process.

“Over the past few years, new agricultural buildings have increased in size and complexity, and we’ve seen an alarming trend of collapses due to inadequate bracing and poor planning,” says Brian Barron, Senior Manager of the Construction Health and Safety Program* at the Ministry of Labour, Immigration, Training, and Skills Development (MLITSD). “In the last three years alone, we’ve seen at least four critical injuries as a result of truss collapses.”

Planning your roof truss installation

For the team at POST Structures, a rural and agricultural building contractor in southwestern Ontario, safe work begins well before any roof trusses are on site.

“Truss day scheduling is a very important aspect of managing a large rural building site,” says Tony Nijenhuis, Construction Manager at POST Structures. That includes getting permits to transport long-span trusses to the site, securing an appropriate crane to lift trusses into place, and ensuring all workers who will be involved in truss installation have received task-specific training and are competent to work at heights.

On the day of installation, POST’s crew inspect all elevating work platforms and fall-arrest equipment prior to use. A dedicated signaller is put in place to help reduce struck-by hazards related to the crane.

“We also have a safety talk with all the crew, so everyone understands their role and knows what’s expected of them,” Nijenhuis adds.

Hoisting and bracing long-span roof trusses

The most significant hazard related to long-span truss installation is that individual trusses are heavy, awkward, and unstable. Section 31(1) of the *Regulation for Construction Projects* (O. Reg. 213/91) acknowledges the danger posed by structural instability, stating that every part of a project must be designed and constructed to support or resist all loads and forces to which it is likely to be subjected and must be adequately braced to prevent any movement that could affect its stability.

With this in mind, the safest way to install long-span roof trusses is to make them as stable as possible before they are placed on the structure. This method starts with building a block of trusses on the ground, supported by temporary horizontal and cross braces. The assembled block is then hoisted into place by a crane—using a spreader bar that has been engineered to handle the load.

*As of early 2025, Brian Barron is CEO of the Ontario Construction Secretariat.



In a best-case scenario, the process is then repeated: each truss block is built on the ground, lifted into place, and braced back to the previous block. (Alternatively, subsequent trusses can be hoisted, secured, and braced one by one.) After all trusses have been installed with horizontal and cross bracing, diagonal bracing must also be added on the undersides of the trusses' top chords.

Properly braced trusses are better able to stand up to unexpected forces (e.g., strong wind gusts) that might otherwise cause them to sway and collapse during installation. This method also cuts down on the amount of time workers spend working at heights.

Refer to IHSA's guideline, *Temporary Bracing for Long-Span Wood Trusses* (W211), for a full breakdown of this truss installation method, as well as two other alternative methods.

Working at heights during roof truss installation

Even if you follow the best practice of assembling and bracing multiple trusses on the ground, the complete installation of a truss system requires some work at heights.

Before this work takes place, it's essential to prioritize thorough planning, proper training, and adherence to safety regulations. Among the many important considerations are:

- **Training:** All workers must receive working at heights training from an approved provider. They should also be given instructions specific to truss installation. For example, POST Structures' in-house training helps workers understand when a truss is secure, where they can attach anchor points, and more.
- **Access:** Whenever possible, use elevating work platforms for installing and bracing trusses once they've been hoisted onto a structure. (Workers must be trained on the class of work platform being used.) Do not work within the trusses unless absolutely necessary.
- **Fall protection:** If work within the trusses is required, workers must use harnesses, lanyards, and engineered anchor points that are properly maintained, inspected, and appropriate for the work conditions.
- **Tools:** At POST Structures jobsites, workers hand-nail all strapping on trusses. "If you ask someone up in the trusses to be 100 per cent tied off and to maintain their grip on a power nailer, the first thing that's going to fall behind is safety," Nijenhuis says. "They're going to make sure they don't drop that nailer." In many cases, lumber is pre-nailed so workers don't need to worry about reaching for nails from their pouches.

As on all complex construction projects, safety is the result of careful planning combined with the coordinated efforts of a competent workforce. When each person understands their role on the jobsite and the hazards they may be exposed to, it helps ensure that roof building is done as safely and effectively as possible. ■



More on long-span truss safety



DOWNLOAD our guideline, *Temporary Bracing for Long-Span Wood Trusses* (W211) for more truss installation best practices: ihsa.ca/products/w211



WATCH our video, *How to Safely Install Wood Trusses on Construction Sites*, produced with the MLITSD and POST Structures: youtube.com/@ihsa-worksafeforlife